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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/057,605	01/24/2002	Ling-Yi Chuang	3158/1J562US1	3125

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DARBY & DARBY P.C.
805 Third Avenue
New York, NY 10022

EXAMINER

MUSSER, BARBARA J

ART UNIT	PAPER NUMBER
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1733

DATE MAILED: 05/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/057,605

Applicant(s)

CHUANG ET AL.

Examiner

Barbara J. Musser

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 February 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7 and 8 is/are allowed.
- 6) ☒ Claim(s) 1-6 and 9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear how there can be a height difference between the second group. It is suggested that applicant intended the claim to mean --a height difference between conjunction portions within the second group--.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Flip Chip Technologies in view of Park et al.(U.S. Patent 6,137,162)

Flip Chip Technologies discloses a method known as Sharp's method(pg. 327) for bonding chips wherein particles are applied to two bonding portions of one substrate, an adhesive is applied to another substrate having two bonding portions, and the substrates are joined together such that the bonding portions contact.(Figures 10.8-

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10.9) It is noted that Mitsubishi's method on p.329 also appears to disclose the same process. While the reference does not expressly state the particles connect the bonding portions on one substrate to the bonding portions on the other substrate, one in the art would understand that for an electrical connection to be formed as is intended by the reference, the particles would have to contact both the bonding portions on one substrate and the bonding portions on the other substrate. Alternatively, it would have been obvious to one of ordinary skill in the art at the time the invention was made to contact the particles applied to the bonding portion of one substrate to the bonding portions of the other substrate since this would form an electrical path as is the purpose of the particles and adhesive.

While the reference does not expressly state the adhesive is clamped between the two substrates, one in the art would understand that the only way to form a path between the two substrates would be to press them together as is suggested in Figure 10.9, thus clamping the adhesive between the layers. Alternatively, it would have been obvious to one of ordinary skill in the art at the time the invention was made to clamp the adhesive layer between the two substrates since this would force the layers together such that the articles would contact both sets of bonding portions forming an electrical connection between the substrates as is desired in the process.

The reference does not disclose some of the particles being spherical while others are cubical. Park et al. discloses that the particles can have a variety of shapes such as spheres, cubes, triangles, etc. (Col. 3, ll. 8-11) It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a mixture of

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shapes for the particles since Park et al. discloses the particles can have various shapes. Absent unexpected results it would have been obvious to use a mixture of the well-known particle shapes since they all provide the same function.

5. Claims 2, 3, 5, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Flip Chip Technologies and Park et al. as applied to claim 1 above, and further in view of Yamada et al.

Regarding claim 2, Flip Chip Technologies does not disclose the bonding portions are bumps, but rather describes them as pads. Yamada et al. discloses that bumps and pads are well-known alternatives in the art since the reference appears to interchange the terms.(Col. 10, ll. 36-41) It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the particles to either the bumps or the terminals as the two perform the same function and since the bumps are made of a material that can flow at high temperatures.

Regarding claims 3 and 5, Flip Chip Technologies does not disclose the specifics of what the bumps and particles are made of. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use any conventional materials such as those disclosed in Yamada et al. since such are well-known and conventional bump and particle materials. Since the circuitry of Yamada et al., which includes the terminals, is plated with gold, and since the particles are made of nickel, the particles would have a hardness greater than that of the bumps since nickel is harder than gold.(Col. 14, ll. 26-28; Col. 4, ll. 49)

Regarding claim 6, Flip Chip Technologies is silent as to the type of adhesive. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use any well-known and conventional adhesive which has been used in this type of device previously such as rubber, which Yamada et al. discloses can be used as the adhesive when connecting two substrates using particles.(Col. 4, ll. 27)

Response to Arguments

6. Applicant's arguments filed 2/12/04 have been fully considered but they are not persuasive.

Regarding applicant's argument that the references do not teach using a mixture of cubical and spherical particles, both types of particles are known. Absent unexpected results it would have been obvious to use any combination of well-known particle shapes since they perform the same function.

Allowable Subject Matter

7. Claims 7 and 8 are allowed.

8. Claim 9 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

9. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record does not teach or fairly suggest connecting together two sets of raised bonding areas by embedding particles in one set of the bonding areas and placing an intermediate material between the two sets so that either the particles bridge the distance between the bonding areas or the particles electrically connect the

bonding areas. Embedded is considered to mean that the particles are partially surrounded by the raised bonding areas.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Barbara J. Musser** whose telephone number is **(571) 272-1222**. The examiner can normally be reached on Monday-Thursday; alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (571)-272-1226. The fax phone

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number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


BJM


JEFF H. AFTERGUT
PRIMARY EXAMINER
GROUP 1300